

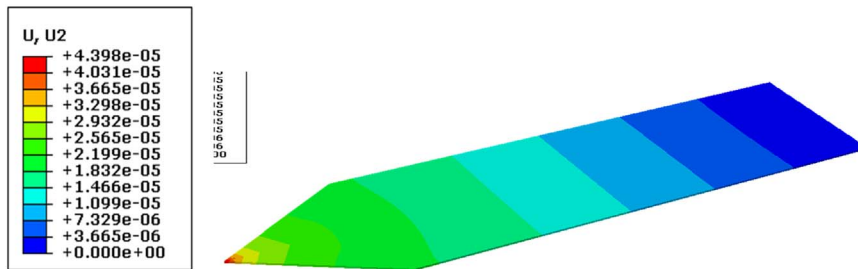
Calibration of atomic force microscopy cantilevers using experimental measurements and Finite Element Analysis

The calibration of Atomic Force Microscopy (AFM) probes is essential to perform accurate force spectroscopy and nanomechanical measurements.

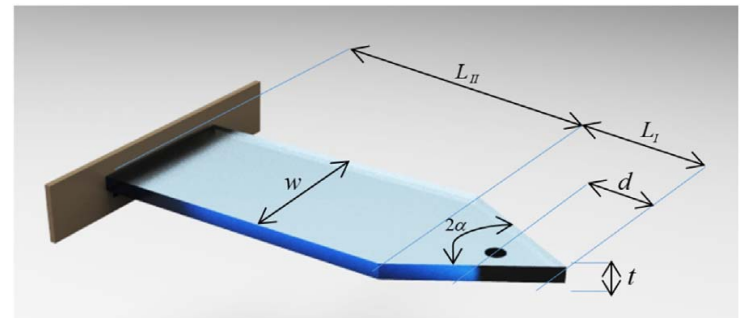
Using Finite Element Analysis (FEA) approaches, the student will simulate the static and dynamic deflection of AFM cantilevers and determine the value of the spring constant for arbitrarily shaped probes. Experimental determination of the spring constant will be also performed using thermal noise methods. The results of simulations and experiments will be compared, and a protocol based on a combination of numerical simulations and experimental measurements will be eventually developed.

M. Chighizola et al., Calibration issues, De Gruyter 2023. DOI: <https://doi.org/10.1515/9783110640632-007>

Rodriguez-Ramos et al., RSI 92, 045001 (2021). DOI: <https://doi.org/10.1063/5.0036263>



FEA simulation of cantilever deformation



Dimensions and geometry of an AFM cantilever

See also

